are unlikely to have symptoms and may be observed at home with poison center consultation. Ingestions of 100 to 200 mg per kg may be managed at home with ipecac-induced emesis and observation. If more than 200 mg per kg has been ingested, the child should be referred to an emergency department for evaluation and treatment. All adults should be evaluated and treated because there is a poor correlation between historical data and the incidence of symptoms. Additionally, adults will require emergency psychiatric evaluation following medical treatment.

Treatment is primarily supportive. Airway control and artificial ventilation are indicated depending on a patient's condition. Hypotension is managed with crystalloid and vasopressors, if needed. Seizures should be managed with the administration of diazepam, followed by phenytoin or phenobarbital; the use of sodium bicarbonate may be required for metabolic acidosis. Bradycardia is treated by giving atropine. Ipecac should be administered as soon as possible following ingestion when not contraindicated. Gastric lavage should be done instead of emesis stimulation when a patient is comatose, lethargic or having seizures. Activated charcoal and a cathartic should be administered following completion of gastric emptying. The role for multiple-dose activated charcoal and forced alkaline diuresis as a means to enhance elimination is unproved.

A nomogram has been developed for ibuprofen plasma concentrations similar to that for aspirin and acetaminophen and may be useful in the early prediction of patients who are likely to have symptoms develop. Plasma concentrations are not widely available and are probably not necessary for managing most cases that remain without symptoms for four to six hours. In a series of 126 cases of ibuprofen overdose, symptoms did not develop later than four hours following ingestion.

As ibuprofen becomes more widely available as a nonprescription medication, overdosage will become a more frequent problem requiring treatment in emergency departments.

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Transcutaneous Cardiac Pacing

TRANSCUTANEOUS CARDIAC PACING was initially described in 1952, but its use was generally abandoned because of the painful muscle contraction and interference with electronic monitoring associated with its use and the development of other techniques of cardiac pacing. Recently interest has been renewed because of the recognized need for an effective, noninvasive, rapidly initiated method of cardiac pacing.

The procedure is relatively simple and requires little training. An external pacing device is connected to two large electrodes. These electrodes are about 8 cm in diameter and are placed in an anterior (cardiac apex)-posterior (left subscapular) configuration. Successful pacing, if it is going to occur, generally requires about 50 to 100 mA. The pacing device can be used in either the demand or fixed-rate mode depending on the clinical circumstances. Electrical capture rates and resulting hemodynamic improvement appear to be equal to transvenous pacing over short periods of time.

Both patients with asystole and those with bradycardia with hemodynamic dysfunction may benefit from the use of transcutaneous pacing. In patients with cardiac arrest the success rate of electrical capture and hemodynamic improvement has been low, but in those with heart block or bradycardia with some perfusion, the results of pacing have been much better. The adoption of larger electrodes that decrease skin stimulation and longer pacing stimuli that decrease the electrical threshold for capture has enabled most awake patients to tolerate the procedure. Ventricular arrhythmias have not been initiated and damage to the myocardium has not occurred with the use of this technique.

Transcutaneous pacing is a rapid and effective method of pacing the heart in emergency situations. It should be considered for use in asystolic patients and those with bradycardia and hemodynamic dysfunction.

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Evaluating Patients With Tricyclic Antidepressant Overdose for Risk of Complications

PATIENTS WHO INGEST tricyclic antidepressant drugs present multiple problems for emergency physicians. Over the years, a relatively standardized treatment of major toxic reactions has developed that includes supportive care, systemic alkalinization and selected antiarrhythmics. In-hospital cardiac monitoring for all patients with evidence of possible tricyclic antidepressant overdose has also become common practice. There has long been concern over whether the use of monitored beds is warranted for patients who present with minimal findings. The isolated reports of serious "delayed" toxic reactions after initially having near-normal findings were taken as evidence, however, that an emergency physician had no choice but to seek admission and monitoring for almost all patients, no matter how apparently trivial their poisoning on initial presentation.

A stumbling block in this dilemma has been the lack of a simple reliable indicator for toxicity. Measuring serum drug concentrations has been shown to be unreliable. The QRS interval on an electrocardiogram was shown in early work to have some correlation with toxic effects but not to be highly accurate or predictive. Recently in a small prospective study, the QRS interval was reported to be an accurate indicator for a risk of ventricular arrhythmias or seizures, but a retrospective review by other authors failed to confirm this. Further prospective studies are needed on this issue.

While an ideal indicator of toxicity risk has not been identified, observing patients for the presence or absence of certain clinical signs may identify those patients at minimal or no risk of a subsequent toxic condition. As early as 1981, a

clinical study reported that all patients who died displayed manifestations of a toxic reaction early in their clinical course. A recent review of the rare cases of "delayed toxicity" showed they occurred in patients who did not receive the modern standard of gastric emptying and activated charcoal administration. A large-scale epidemiologic review of fatalities due to tricyclic antidepressant overdose has shown that all patients who arrive at a hospital alive will manifest significant signs of toxic effects within an hour of presentation. Other clinical studies of patients admitted with nonfatal tricyclic antidepressant overdosage have confirmed this finding that significant evidence of a toxic reaction occurs during the early hours of evaluation, if it is to occur at all.

Multiple studies now indicate that initially observing patients who present with possible tricyclic antidepressant overdosage for a period of six hours should identify a group with a low risk of a subsequent serious toxic reaction. All patients should have their stomachs emptied, receive activated charcoal and have electrocardiographic monitoring. A patient who has altered consciousness, arrhythmias, seizures, respiratory compromise, cardiac conduction defects or hypotension warrants intensive care admission. Other patients can be relegated to a lower level of medical or psychiatric (depending on condition) care. Patients who show no toxic effects other than sinus tachycardia after appropriate initial decontamination and six hours of careful observation are in an extremely low-risk group and may be suitable for outpatient management after psychiatric evaluation.

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Treatment of Snakebite

RATTLESNAKE BITES should be considered a medical emergency, and patients should be quickly transported to a hospital. The clinical findings following snake envenomation are dependent on many variables. The toxicity of venom varies among the 25 or more species of rattlesnakes in the United States. In about 15% to 25% of the victims bitten by vipers, no envenomation occurs. If a victim is bitten and envenomated, the amount of venom injected depends on many factors such as the activity of the snake, defensive or offensive posturing, the size of the snake and the depth and number of bites.

Recommendations for the treatment of rattlesnake bites have been the subject of debate. Tourniquets may not be helpful in affecting overall outcome. Originally designed to obstruct lymph flow, the significance of lymph drainage to systemic morbidity and mortality has never been clearly established. In addition, tourniquets may be applied too tightly, leading to venous congestion and further damage to an already injured extremity. In general, incision and suction may not be helpful in the field management of most snakebites and may only add insult to injury. Some authorities still recommend suction if a patient is more than an hour away from definitive care, but it must be begun within 5 minutes and is of absolutely no use if started more than 15 minutes after envenomation. At best no more than 10% to 20% of the venom can be removed. In the past, applying ice had been recommended to cool the snakebite area locally or even an entire extremity. This is no longer recommended.

Recently the American Association of Poison Control Centers and the American College of Emergency Physicians have recommended the following measures for first aid: "(1) immobilize the bitten part, (2) remove constrictive items and rings, (3) put the victim at rest and (4) transport to the nearest medical facility."

Numerous measures should be begun immediately when a patient arrives at hospital. Laboratory studies such as a complete blood count, electrolyte levels, arterial blood gas determinations, fibrinogen titers, urinalysis, platelet count, clotting times, prothrombin and partial thromboplastin times and type and crossmatch should be done immediately. Antivenom available in the United States for the treatment of rattlesnakes is a polyvalent blend effective against all species. Its use should be considered in all patients with systemic signs of envenomation and those with significant local effects. Rattlesnake bites are generally classified as minimal, moderate or severe. The guidelines for the use of antivenom are as follows: minimal bites, 5 to 8 vials; moderate bites, 8 to 12 vials, and severe bites, 13 vials or more as titrated to clinical condition. The patient should be skin tested before administering the antivenom, as it is derived from horse serum. If a patient is allergic to the antivenom, it can be given cautiously in conjunction with other measures described elsewhere. As many as ten ampules can be placed in 500 ml of a normal saline solution and run in over a one-hour period. Recent recommendations have discouraged the use of corticosteroids (except in patients hypersensitive to antivenom) and excisional therapy. A fasciotomy for compartment syndromes should only be considered when objective monitoring shows elevated pressures unresponsive to antivenom.

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Clinical Uses for a New β-Lactamase Inhibitor Antibiotic

AMPICILLIN and its analog, amoxicillin, have been considered the initial drugs of choice for treating bacterial infections involving the genitourinary tract, respiratory tract, sinuses and middle ear. Recently, however, common bacterial respiratory pathogens such as *Hemophilus influenzae* and genitourinary pathogens such as *Escherichia coli, Proteus mirabilis* and *Neisseria gonorrhoeae* have become increasingly resistant. *Staphylococcus aureus* has long been resistant to penicillins. In addition, newly recognized respiratory pathogens